

WE CLAIM:

1. A method for updating firmware within at least one network attached computer over a distributed network comprising:

receiving over the distributed network at the network attached computer, an instruction to begin a firmware recovery procedure;

in response to receiving the instruction, transitioning the network attached computer to a recovery state;

receiving a new firmware image over the distributed network; and

in response to receiving the new firmware image, updating a current firmware within the network attached computer with the new firmware image.

2. The method of claim 1, wherein the instruction to begin the firmware recovery procedure is received from a manager computer an agent application executing on the network attached computer, and wherein the method further comprises in response to transitioning to the recovery state, sending a notification of readiness to update from the network attached computer over the distributed network to the manager computer.

3. The method of claim 2, wherein updating the current firmware with the new firmware image comprises erasing the current firmware and copying the new firmware image to a memory location of the network attached computer.

4. The method of claim 1, wherein transitioning the network attached computer to the recovery state comprises rebooting the network attached computer to an operating system independent operating environment.

5. The method of claim 1, wherein receiving a new firmware image comprises receiving the new firmware image in fragments over the distributed network, and wherein the method further comprises:

receiving a broadcast status request prior to updating the current firmware;

in response to receiving the broadcast status request, determining whether a rebroadcast of any fragment of the new firmware image is necessary;

in response to determining that the rebroadcast of one or more fragments is necessary, sending a request for the rebroadcast of the fragments; and

receiving the rebroadcast of the fragments in response to sending the request.

6. The method of claim 5, wherein determining whether the rebroadcast of any fragments of the new firmware image is necessary comprises determining whether any fragments are missing or corrupted.

7. The method of claim 5, wherein the fragments of the new firmware image are numbered.

8. The method of claim 1, wherein the distributed network supports a user datagram protocol/Internet protocol.

9. The method of claim 1, further comprising monitoring a communication port of the network attached computer for the instruction to begin the recovery procedure.

10. The method of claim 9, wherein the communication port of the network attached computer is monitored by a recovery OS application that monitors instruction activity upon only one communication port and utilizes additional processor resources on the network attached computer only upon receiving the instruction.

11. The method of claim 2, further comprising:
in response to updating the current firmware with the new firmware image, sending a notification of the update to the manager computer.
12. The method of claim 1, further comprising:
determining whether the current firmware is valid after being updated;
and
when it is determined that the current firmware is valid then initiating a boot of the network attached computer utilizing the current firmware.
13. The method of claim 1, wherein the firmware within the network attached computer comprises a BIOS of the network attached computer.
14. A computer-controlled apparatus capable of performing the method of claim 1.
15. A computer-readable medium comprising computer executable instructions which, when executed by a computer, cause the computer to perform the method of claim 1.
16. A method for recovering firmware on a network attached computer over a distributed network, comprising:
sending a recovery request over the distributed network;
in response to sending the recovery request, receiving a new firmware image over the distributed network; and
in response to receiving the new firmware image, updating a current firmware with the new firmware image.
17. The method of claim 16, wherein the recovery request is sent to a network address of a recovery manager computer storing the new firmware image.

18. The method of claim 17, wherein the network address of the recovery manager computer is stored on the network attached computer.

19. The method of claim 17, wherein the network address of the recovery manager computer is located by querying a baseboard management controller operating on the network attached computer.

20. The method of claim 16, further comprising:
determining whether the current firmware within the network attached computer is invalid; and
sending the recovery request in response to determining that the current firmware is invalid.

21. The method of claim 20, further comprising booting the network attached computer with the current firmware in response to determining that the current firmware within the network attached computer is valid.

22. The method of claim 17, further comprising:
determining whether the current firmware is valid after being updated with the new firmware image; and
in response to determining that the current firmware is valid, booting the network attached computer.

23. The method of claim 16, wherein updating the current firmware with the new firmware image comprises erasing the current firmware from and copying the new firmware image to a memory location of the network attached computer.

24. The method of claim 17, wherein sending the new firmware image comprises broadcasting the firmware image as a broadcast packet and wherein the new

firmware image is received in fragments over the distributed network, further comprising:

- prior to updating the current firmware and in response to receiving the new firmware image, receiving a broadcast status request;

- in response to receiving the broadcast status request, determining whether a rebroadcast of any fragments of the new firmware image is necessary;

- in response to determining that the rebroadcast of one or more the fragments is necessary, sending a request for the rebroadcast of the fragments over the distributed network; and

- in response to sending the request for the rebroadcast of the fragments, receiving over the distributed network, the fragments of the new firmware image requested.

25. The method of claim 24, wherein determining whether the rebroadcast of any fragments of the new firmware image is necessary comprises determining whether any fragments are missing or corrupted.

26. The method of claim 24, wherein the fragments of the new firmware image are numbered and the request for the rebroadcast excludes or includes a number for each fragment requested.

27. The method of claim 17, further comprising:

- in response to updating the current firmware with the new firmware image, sending a notification of the update to the recovery manager computer.

28. The method of claim 16, further comprising:

- determining whether the current firmware is valid after being updated;
- and

- when it is determined that the current firmware is valid then initiating a boot of the network attached computer utilizing the current firmware.

29. The method of claim 16, wherein the firmware within the network attached computer comprises a BIOS of the network attached computer and wherein the firmware is recovered while the network attached computer is in an OS independent state.

30. A computer-controlled apparatus capable of performing the method of claim 16.

31. A computer-readable medium comprising computer executable instructions which, when executed by a computer, cause the computer to perform the method of claim 16.

32. A system for updating the firmware of at least one network attached computer over a network, the system comprising:

a first computer operative to:

send an instruction to update the firmware of the network attached computer over the network;

receive a notification of readiness for update from the network attached computer over the network; and

in response to receiving the notification of readiness, send a new firmware image over the network; and

a second computer comprising the network attached computer operative to:

monitor a communications port of the second computer for the instruction to update the firmware;

in response to receiving the instruction, transition to an OS independent recovery state;

in response to transitioning to the recovery state, send the notification of readiness to the first computer over the network;

in response to sending the notification of readiness, receive the new firmware image; and

in response to receiving the new firmware image, update the current firmware with the new firmware image.

33. The system of claim 32, wherein the first computer is further operative to reboot the second computer utilizing the current firmware after the current firmware is updated with the new firmware image.

34. The system of claim 32, wherein the network supports user datagram protocol/Internet protocol, wherein the new firmware image is received in fragments over the distributed network, and wherein the second computer is further operative to:

prior to updating the current firmware and in response to receiving the new firmware image, receive a broadcast status request from the first computer; and

in response to receiving the broadcast status request, identify any fragments of the new firmware image that are corrupted or missing;

in response to identifying one or more of the fragments that are corrupted or missing, send a request for the rebroadcast of the fragments identified over the network to the first computer; and

in response to sending the request for rebroadcast of the fragments identified, receive over the network from the first computer, the fragments of the new firmware image requested.

35. The system of claim 32, wherein the second computer is further operative to in response to updating the current firmware with the new firmware image, send a notification of the update over the network to the first computer and wherein the system further comprises a display device wherein the first computer is further operative to display update status messages via the display device.

36. The system of claim 32, wherein the firmware comprises a BIOS of the second computer.

37. A system for recovering the firmware of at least one network attached computer over a network, the system comprising:

a first computer operative to:

monitor a communication port of the first computer for at least one recovery request;

receive the recovery request from the network attached computer;

and

in response to receiving the recovery request, send a new firmware image over the network; and

a second computer comprising the network attached computer operative to:

determine whether a current firmware on the second computer is invalid while in an OS independent recovery state;

in response to determining that the current firmware is invalid, send the recovery request to the first computer over the network;

in response to sending the recovery request, receive the new firmware image; and

in response to receiving the new firmware image, update the current firmware with the new firmware image.

38. The system of claim 37, wherein the first computer is further operative to reboot the second computer with the current firmware after the current firmware is updated with the new firmware image.

39. The system of claim 37, wherein the network supports user datagram protocol/Internet protocol, wherein the new firmware image is received in fragments over the network, and wherein the second computer is further operative to:

prior to updating the current firmware and in response to receiving the new firmware image, receive a broadcast status request from the first computer; and

in response to receiving the broadcast status request, identify any fragments of the new firmware image that are corrupted or missing;

in response to identifying one or more of the fragments that are corrupted or missing, send a request for the rebroadcast of the fragments identified over the network to the first computer; and

in response to sending the request for rebroadcast of the fragments identified, receive over the network from the first computer, the fragments of the new firmware image requested.

40. The system of claim 37, wherein the firmware comprises a BIOS of the second computer and wherein recovery of the firmware is executed while the second computer is in an OS independent state.